REMARKS

As of the Office action dated January 8, 2008, claims 1-13, 18 and 20-23 are pending, with claims 1, 2, 4, 5, 7, 9-12 and 21-23 having been rejected, claims 3, 6, 8 and 13 having been objected to, and claims 18 and 20 having been allowed.

Claims 1, 2, 4, 5, 7, 9-12 and 21-23 are Patentable Over Zucker et al.

Claims 1, 2, 4, 5, 7, 9-12 and 21-23 have been rejected under 35 USC § 102(b) as being anticipated by a new reference, US Patent No. 5,394,415 issued to Zucker et al. The rejection is traversed.

Zucker discloses an optical modulator which includes an electro-optical device ("EOD") that is placed in the path of optical energy for modulating the optical energy in accordance with an applied voltage. The disclose can be most easily understood with reference to the simple example shown in FIG. 1A, which includes a single photoconductive switch S1 for transferring voltage from a storage capacitor C1 to the EOD 13. The EOD 13 is a device that includes or contains "electro-optic material which alters the state of a light beam passing through it," id. col. 6, lines 59-60. It is not a laser diode, but rather is intended to be placed in the path of optical energy, such as in a laser cavity. Unlike a laser diode, "the EOD has an associated capacitance formed by the electrodes on the EOD and the material between the electrodes," id. col. 7, lines 6-8. This capacitance is notable because "the optical-to-optical modulator is selectively controlled ... ***to control the charge on the EOD*** ... whereby optical energy passing through the modulator may be selectively controlled as desired," id. col. 7, lines 13-18 (emphasis supplied). The circuit of FIG. 1D to which the examiner refers is similar to the circuit of FIG. 1A except that it uses a "two-state switching circuit" in which "the applied control voltage across the EOD 13 can be further controlled (i.e., increased or decreased) by means of a second voltage source," id. col. 16, lines 45-49; see also lines 49-54.

There are several material differences between Zucker and the claimed invention which establish that the claimed invention is not only not anticipated by Zucker, but is also not obvious over Zucker. These are (1) the EOD is not a laser diode; (2) Zucker does not teach or disclose a fast voltage discharge stage relative to a slow voltage discharge stage; and (3) the EOD identified in Figure 1D as Ce and the C1-S1 and C2-S2 circuits function entirely differently than the laser diode and the slow and fast discharge stages of the claimed invention.

(1) The EOD is Not a Laser Diode

The EOD is not a laser diode. The EOD represented in Figure 1D by Ce includes electro-optic material which modulates light when a voltage is applied, i.e., turn light off or on). The light to be modulated may, for example, be inside a laser cavity where the EOD can be used to Q-switch, modelock, or cavity dump the laser. Thus, Zucker does not disclose a pulsed laser diode driver, and the EOD as taught by Zucker (Ce in FIG. 1d) does not produce light (see Abstract; see also col. 1, lines 12-25 & col 4, lines 3-5). Rather, the EOD only modulates light.

The examiner appears to be of the view that the EOD, which is represented in Figure 1D by Ce, is a laser diode. Specifically, the examiner states on page 3 that "fig. 1d represented by Ca, taught to be many types of laser including solid state, col 13 lines 40-45)." However, the cited Zucker disclosure has been misunderstood. The referenced lines do not concern the EOD. Instead, the referenced lines concern other elements in the optical energy path, specifically so-called "active medium." While active medium (72 in fig 7) may be many types of lasers, the active medium is not the same element as Ce in Fig 1d, which is the EOD. Notably, the Zucker capacitor C1 is not connected through a switch to this "active medium." Rather, the Zucker capacitor C1 is connected through a switch to the EOD, which as Zucker states may be, for example, a Pockels Cell. Pockels cell do not produce light, they only modulate light. The teaching of the Zucker patent is unambiguous; the capacitor C1 is connected through a switch to a capacitor Ce, the capacitor Ce is an EOD, and an EOD is not a laser or any type of lasing material.

Therefore, the claimed invention is not anticipated by Zucker.

(2) Zucker Does Not Disclose Fast Relative to Slow Voltage Discharge Stages

Zucker contains no teaching or disclosure whatsoever regarding the relative speed of the C1-S1 and C2-S2 circuits. This is because the circuits are used to affect the dc condition (steady state) of the EOD by transferring charge between a storage capacitor and the EOD, not to control pulse characteristics as is the function of the claimed invention (the examiner will recall that the claimed fast voltage discharge stage may function to determine the rise time of the pulse, while the slow voltage discharge stage may function to determine the pulse width). As explained in Zucker col. 7, lines 31-36,

> Basically, the dc condition of the EOD is controlled from one dc condition to a second dc condition, and subsequently to a third condition, a fourth condition, and so on as desired, in order to change its electric field and thereby modulate the optical energy passing through it.

The examiner is also mistaken about the storage capacity teachings of Zucker. The examiner asserts that Zucker discloses on page 3 "... having a second energy storage capacity less than the first energy storage capacity (col 17 lines 4-6),..". In fact, Zucker is unconcerned about the energy storage capacity and contains no particular teaching about it. While Zucker does disclose that "the ***charge stored*** on capacitor C2 is higher than the ***charge stored*** on capacitor C1" (emphasis supplied), this teaching says nothing about relative energy storage capacities. The charged stored on a capacitor is equal to the capacitance (or capacity) times the voltage (Q=CV). The charge on one capacitor can be higher than another even though its capacitance is less (i.e. its voltage is higher). For example, capacitor A having a capacitance (capacity) of 100μF and a voltage of 1 volt would have a charge of 100μC, while capacitor B having a much small capacitance (capacity) of 1μF and a voltage of 1000 volts would have a much larger charge of 1000μC. Thus capacitor B would have more charge stored than capacitor A even though its capacity is less (1μF < 100μF).

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In other words, Zucker does not distinguish between the capacity of one capacitor versus another. This is so because Zucker is disclosing a charge transfer circuit (col 4, lines 44-47, col 5, lines 13-21), where it is the total charge that matters not the individual capacity.

Therefore, the claimed invention is not anticipated by Zucker.

(3) The Functions of the EOD and the C1-S1 and C2-S2 Circuits Are Different

It is doubtful that one of ordinary skill would even try to use the EOD identified in Figure 1D as Ce and the C1-S1 and C2-S2 circuits to make a pulsed laser diode driver, since there would be no expectation of success. However, even if one of ordinary skill were to try to use the EOD and the C1-S1 and C2-S2 circuits to make a pulsed laser diode driver, there would be no success. The EOD cannot generate light, even if it is pulsed. Moreover, the C1-S1 and C2-S2 circuits as taught by Zucker are for dc conditions, and do not function as slow and fast discharge stages.

Therefore, the claimed invention is not obvious over Zucker.

Conclusion

The application is patentable over Zucker and is otherwise in condition for allowance. Applicants respectfully request favorable reconsideration and the timely issuance of a Notice of Allowance.

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